

### **Remarks**

The Applicants have added new Claim 15 which merely combines the subject matter of Claims 7 and 11 into independent form. Thus, the newly added claim presents no new issues for search or consideration. Claim 7 has been amended to correct an inconsistency and to recite particulars of skin-pass rolling. Support may be found in the Applicants' Specification on page 19, paragraph [0060], for example. Claim 11 has been cancelled. Entry into the official file is respectfully requested.

The Applicants acknowledge the rejection of Claims 7-11 under 35 U.S.C. §103 over EP '685 and the rejection of Claims 12-14 over the combination of the Applicants' "admitted prior art" on pages 1-3 with EP '685. The Applicants respectfully submit that all of those claims are patentable over EP '685 taken alone or in combination with the "admitted prior art" for the reasons set forth in detail below.

Starting first with the Applicants' claimed average surface roughness of about  $0.3\ \mu\text{m}$  or less, the Official Action takes the position that a value of less than  $5\ \mu\text{m}$  is set forth in EP'685 at page 4, line 25. However, the Applicants note that the value set forth in EP '685 is not the value of the average surface roughness  $R_a$  as recited in the solicited claims. In that regard, the Applicants invite the Examiner's attention to lines 21-31 of page 4 of EP '685 wherein it is seen that the values are of maximum roughness ( $R_{\text{max}}$ ) in the direction perpendicular to the tensile direction wherein the values were measured by a surface coarseness meter when 20% of the tensile strength was added to a JIS No. 5 tensile test piece.

This is sharply contrasted to average surface roughness  $R_a$  of the claimed steel sheets which is measured not by imparting tensile strength as was imparted in the case of EP '685, but instead, by using a surface roughness meter for measuring the average surface roughness  $R_a$ . Therefore, there is

utterly no teaching or suggestion in EP '685 that the average surface roughness is about  $0.3\text{ }\mu\text{m}$  or less as recited in the solicited claims. The fact is that the roughnesses are quite dissimilar and it is not possible to make a comparison between the claimed average surface roughness  $R_a$  and the maximum roughness  $R_{\text{max}}$  of EP '685.

The Official Action takes the position that the process steps and composition are quite similar and that the roughnesses would be expected. The Applicants respectfully submit that this is not true as evidenced by the subject matter of original Claim 11 (now cancelled), for example, and as set forth in new Claim 15 which specifically claims skin-pass rolling the pickled sheet. There is no disclosure at all in EP '685 regarding skin-pass rolling. Therefore, one of ordinary skill in the art would reasonably expect that the average surface roughnesses of the steels set forth in the solicited claims would likely be different from the average surface roughnesses of the steels of EP '685, as opposed to being the same. The fact is that skin-pass rolling, for example, is a significant difference nowhere taught or suggested in EP '685. This results in a different steel having a different average surface roughness.

The Official Action also notes that the amount of vanadium up to 0.3% may be an inevitable "impurity." The Applicants specifically claim 0.004 to 0.3% of vanadium. There is a reason for this. The reason is that the presence of vanadium improves the toughness of the steel sheet by an unexpected amount. To demonstrate this fact, the Applicants conducted comparative experiments wherein the amount of vanadium was varied so that it was inside the claimed range on one hand and outside the claimed range on the other hand. The Applicants surprisingly discovered that the toughness of the resulting steel sheets increased rather dramatically compared to the steel sheet having a quantity of vanadium outside of the claimed range. This is shown and explained in more detailed in the attached Declaration of Mr. Yazawa. The Applicants particularly invite the

Examiner's attention to the absorbed energy shown in the temperature graph attached to Mr. Yazawa's Declaration which shows the dramatic increase in toughness when the claimed quantity of vanadium is present.

The Applicants respectfully submit that one of ordinary skill in the art would have had no reasonable expectation that such a change in toughness would occur by the addition of an "impurity" as vanadium is characterized in EP '685. The Applicants respectfully submit that an obviousness rejection must be based on teachings or suggestions that modifications be made based on the prior art and that one of ordinary skill in the art would have a reasonable expectation of success if the modification were to be made. The Applicants respectfully submit that EP '685 fails to meet both tests. Specifically, vanadium is mentioned as an "impurity" in EP '685. This provides utterly no teachings or suggestions to one of ordinary skill in the art to make modifications to the EP '685 steel with respect to the inclusion vanadium or any particular amount of vanadium. By virtue of the fact the vanadium is characterized as "impurity" this inherently means that there is no suggestion to include vanadium. In any event, EP '685 does not satisfy the second part of the necessary obviousness test which requires a reasonable expectation of success. There is absolutely no discussion or any disclosure in EP '685 that would lead one of ordinary skill in the art to have any expectation, much less a reasonable expectation of success, that toughness would be increased by having the claimed quantity of vanadium as shown in Mr. Yazawa's Declaration. The Applicants therefore respectfully submit that EP '685 cannot support a rejection whether taken alone or when taken with the Applicants' "admitted prior art."

The Applicants respectfully submit that the above claimed features result in improvement of brittle resistance of secondary processing of a finished cold-rolled sheet even with a steel sheet obtained through identical conditions, such as compositional component, hot rolling, cold rolling

reduction rate, heat treatment and the like. In addition, the Applicants have found that by controlling particle size of the finished cold-rolled steel sheet to 40  $\mu\text{m}$  or less, brittle resistance to secondary processing and surface roughness are further improved.

In sharp contrast, EP '685 does not disclose the extent of average surface roughness and particle size of a finished cold-rolled sheet that would in any way improve brittle resistance to secondary processing. EP '685 further utterly fails to disclose, teach or suggest another aspect of Claim 7 wherein the Applicants' skin-pass roll the pickled sheet with skin-pass rolls having a roughness  $R_a$  of 0.05 to 1  $\mu\text{m}$  at a reduction rate of 0.05 to 10%. Careful scrutiny of the EP '685 disclosure reveals that there is no disclosure at all on this point, especially since EP '685 does not mention skin-pass rolling at all, much less skin-pass rolls having roughness of 0.5 to 1  $\mu\text{m}$  and/or a reduction of 0.05 to 10%. The Applicants therefore respectfully request withdrawal of both rejections, based on EP '685 taken alone or taken with the "admitted prior art."

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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